

What is claimed:

1. An implant for vertebral replacement comprised by inner supports to the vertebral plates, vertebral separating means and vertical members for adjusting the implant to the corresponding vertebral faces, wherein the piece of the inner support implant emulates the shape of the cortical tissue area of the vertebral plate thereby forming a frame and leaving the spongy tissue area of the vertebral plate free.
2. The implant of claim 1, wherein the shape of the inner support in a lumbar vertebra has a shape of a trapezoidal ring.
3. The implant of claim 1, wherein the shape of the inner support in a thoracic vertebra is triangulate ring-shaped.
4. The implant of claim 1, wherein the shape of the inner support in a cervical vertebra is rectangular ring-shaped with a central projection on each small side representing a two letter "E" shape said E facing each other.
5. The implant of claim 2, wherein the separating means are supported on and fixed to the inner support.
6. The implant of claim 5, wherein the vertical member and the inner support constitutes just one piece, having, thus a one piece superior member and a one piece inferior member plus separating means.

7. The implant of claim, wherein the vertebral separating means constitute a set of bars and a set of tubes, corresponding with each other, the outer diameters of the bars and the inner diameters of the tubes having a size enabling the adjusted slipping of the bars into the tubes and the fixation thereof at a height determined by fixing means.

8. The implant of claim 6, wherein the superior piece and the inferior piece allows the insertion of a removable jig, having a shape corresponding to the frame and a wedge-like shape which angles are predetermined; pieces includes incuts for purposes of insertion and removal of the jig.

9. The implant of claim 7, wherein the horizontal part of the superior and inferior pieces may be inclined with respect to the vertical members, to provide angular correction to the spine.

10. The implant of claim 7, wherein both the tubes and the bars are fixed in middle points in at least two of the sides forming the inner support.

11. The implant of claim 7, wherein both the tubes and the bars are fixed between the center and the posterior area points in just two opposite sides of the inner support.

12. The implant of claim 7, wherein the bar diameter is lower than 8 mm.

13. The implant of claim 10, wherein the bar diameter is of 4 mm.

14. The implant of claim 7, wherein the bars are grooved in order to obtain diameter sections lower than the bar predetermined diameter to cut the bars.

15. The implant of claim 14, wherein the bar grooving is indented and the corresponding tube includes a device for obstructing the bar slipping into the tube towards a direction preferably corresponding to the approach of the vertebral separating pieces and the telescopic adjustment.

16. The implant of claim 7, wherein it is composed of four pieces:  
an upper supporting piece having a horizontal member and a vertical extension for its adjustment to the lateral vertebral face by means of screws;  
a telescopic adjusting piece having a flat member suitable for its adjustment to the upper supporting piece and at least two vertical extensions being tubes perpendicular to the horizontal member; a piece of vertebral separation composed of a flat member and a number equal to the telescopic adjusting piece of vertical extensions being bars perpendicular to the horizontal member which will be introduced into the tubes of the telescopic adjusting tubes; a bottom supporting piece having a horizontal member and a vertical extension for its adjustment to the vertebral lateral face by means of screws.

17. The implant of claim 16, wherein the horizontal members of the upper and bottom supporting pieces, and the horizontal members of the telescopic adjusting piece, and the vertebral separating piece have the shape selected from the group defined by the vertebral plate cortical areas of the lumbar vertebrae with a vertebral ring shape, ring-shaped cervical vertebrae formed by

two letters "E" facing each other and thoracic vertebrae with a triangulate ring shape.

18. The implant of claim 16, wherein the bottom supporting piece is composed of a flat member and a flat extension which is adapted to the sacral bone, said flat member having an adaptable rectangular ring shape and adjustable to the vertebral separating piece.

19. The implant of claim 16, wherein the upper and bottom supporting pieces are a horizontal wedged member forming an angle for the restoration of the spinal curvature.

20. The implant of claim 16, wherein the union of pieces to each other is manually made with adjusting and fixing screws.

21. The implant of claim 7, wherein it is comprised by two pieces: an upper supporting and telescopic adjusting piece having a horizontal member and a vertical extension for its adjustment to the vertebral lateral face by means of screws, and at least two vertical extensions being tubes perpendicular to the horizontal member; a bottom supporting and vertebral separating piece having a flat member and a number equal to the telescopic adjusting piece of vertical extensions being bars perpendicular to the horizontal member, which will be introduced into the tubes of the telescopic adjusting piece, and a vertical extension for its adjustment to the vertebral lateral face by means of screws.

22. The implant of claim 21, wherein the horizontal members of said pieces have the shape selected from the group defined by the cortical areas of the vertebral plates of lumbar vertebrae having a vertebral ring shape, cervical vertebrae with a shape formed by two letters "E" facing each other, and triangulate ring shaped thoracic vertebrae.

23. The implant of claim 21, wherein the horizontal members of the pieces are comprised by a flat member and a flat extension which is adapted to the sacral bone, with a rectangular ring shape.

24. The implant of claim 21, wherein the piece horizontal members are wedged shaped forming an angle for the restoration of the spinal curvature.

25. The implant of claim 16, wherein the union between supporting pieces and vertebral separation and telescopic adjusting pieces have reciprocal fitting mechanisms.

26. The implant of claim 16, wherein the vertebral supporting surfaces of said pieces have surfaces which are not smooth.

27. The implant of claim 26, wherein the vertebral supporting pieces have wrinkled surfaces.

28. The implant of claim 26, wherein the vertebral supporting pieces have indented surfaces.

29. The implant of claim 16, wherein the lateral extensions adjusting against the lateral vertebral face enable the insertion of screw oblique to the longitudinal axis of the vertebrae.

30. The implant of claim 16, wherein the vertebral supporting piece and the vertebral separating piece are comprised by a unique piece having three flat members forming at least obtuse angles between them, and its bottom member includes vertical bars; its middle flat member includes holes for the passage of screws, thus turning this configuration suitable for its placement in the axis bone.

31. The implant of claim 16, wherein the vertical extensions of the vertebral supporting pieces include a stop system to prevent the screws that penetrate into the vertebral body from their longitudinal slipping.

32. The implant of claim 31, wherein said stop system is comprised by a groove in the lateral extension where there are holes for the screws to penetrate into the vertebral body, said groove having a rectangular shape with upper and lower semicircular ends; an end of the groove will have a hole for the passage of the screw; the other end will have a slipping stop with a circular shape and a groove which serves as a guide to the headed bar type projection; and said guide-groove is vertically orientated in order to enable the slipping towards the screw head and continues with an extension following the direction of the circumference which enables it to rotate, thus avoiding the vertical slipping of the stop.

33. The implant of claim 7, wherein it is composed of 6 pieces:

an upper supporting piece and a bottom supporting piece having a horizontal member and which are indistinctly fixed to a telescopic adjusting and vertebral separation piece, by means of vertical projecting sheets that fit in lateral grooves of the telescopic adjusting or vertebral separation piece; an upper vertical extension piece and a bottom adjusting piece for their adjustment to the vertebral lateral face by means of screws, which includes holes arranged for said purpose and which are adjusted to the telescopic adjusting or vertebral separation piece by means of two horizontal bars, which insert in the corresponding horizontal holes in the telescopic adjusting or vertebral separating piece, which final fixation is carried out by means of screws fit in holes located in the lateral faces of the telescopic adjusting and vertebral separating pieces;

a telescopic adjusting piece composed of a flat member suitable for the adjustment thereof to the upper supporting piece, which includes grooves in at least two of its lateral faces to be fit in the vertebral supporting pieces, and at least two holes horizontally extend in order to contain two tubes of the vertical extension piece, and at least two vertical extensions being tubes perpendicular to the horizontal member; a vertebral separating piece composed of a flat member and a number equal to the telescopic adjusting piece, of vertical extensions being bars perpendicular to the horizontal member and said bars will be introduced into the tubes of the telescopic adjustment piece; said vertebral separating piece includes grooves in at least two of its lateral faces to be fit in vertebral supporting pieces, and at least two holes horizontally extending to contain two tubes of the vertical extension piece.

34. The implant of claim 7, wherein the bars and tubes are fixed with a leaning in relation to the pieces holding them, thereby providing the implant set with a curvature.

35. The implant of claim 7, wherein it includes incuts and discontinuities for the use of nippers with stops that enable the vertebral separation and the placement of the implant by means of said instrument.

36. A method for the placement of an implant of claim 35, wherein it comprises placing the implant in nippers having stops in the ends thereof; placing the nippers ends in the ends of the plates of two opposite vertebrae by exerting pressure on the nippers in order to separate the intervertebral bodies together with the separation of the implant pieces; slipping the implant inside the intervertebral space using the nippers arms and the incuts of the implant as a guide; reducing the pressure on the nippers and remove it through the discontinuities in the frames of the implant horizontal members; definitely adjusting the bars to the tubes.

37. The implant of claim 8, wherein the removable jig includes on its top surface a series of orientated wings offering resistance against slipping.

38. The implant of claim 8, wherein the wedge-like shape of the jig may form angles of 0 degrees, 1 degree, 2 degrees and 3 degrees.



39. The implant of claim 7, wherein both the tubes and the bars are fixed in the vertices of the inner supports.

40. The implant of claim 9, wherein the inclination of horizontal part of the superior and inferior pieces with respect to the vertical members, to provide angular correction to the spine is selected from the following values: 0 degrees, 5 degrees and 9,5 degrees.

41. The implant of claim 7, wherein the vertical extension has a curved shaped to adjust the device to the lateral vertebral face.

42. The implant of claim 7, wherein the vertical extension has an horizontal slipping at pretermind distances.

43. The implant of claim 7 , wherein t he superior piece includes a removable optional screen fixed by a screw to the piece to be located in the anterior area to avoid the migration of bone out of the vertebral area.

44. The implant of claim 7, wherein includes just two bars and two corresponding tubes for separating means.

45. The implant of claim 8, wherein the jig is made of titamium microgranules.

46. The implant of claim 7 wherein the bars and tubes allows an adjustment in height of 11 mm.